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otherwise unaccountable appearance, was occasioned intirely by its inverting the object, for the reasons above given. If it be asked, why then do not the common long refractors, which generally invert, produce the same deception? I answer, very probably they would do so if set beside a Gregorian reflector and the eye applied alternately to the one and to the other\*.

### N<sup>o</sup> III.

#### *Description of the White Mountains in New-Hampshire.*

By THE REV. JEREMY BELKNAP OF NEW-HAMPSHIRE.

Read Oct.  
15, 1784.

THE white mountains in the northern part of New-Hampshire have, from the earliest settlement of the country, attracted the attention of all sorts of persons. They are undoubtedly the highest lands in New-England, and are discovered in clear weather by vessels coming on the eastern coast, before any other land; but by reason of their bright appearance are frequently mistaken for clouds. They are seen on shore at the distance of sixty or eighty miles on the south and south-east sides, and are said to be plainly visible in the neighbourhood of Quebec. The Indians had a superstitious veneration for them as the habitation of invisible beings, and for this reason never ventured to ascend their summits, and always endeavoured to discourage every person who attempted it. From them, and the captives whom they formerly led to Canada through the pass of these mountains, many fictions have been propagated through the country which have in time swelled to marvellous and incredible stories; particularly,

\* The above was written in 1774, when I had no achromatic astronomical telescope in my possession.

larly, it has been reported that carbuncles have been seen at immense heights, and inaccessible spots which give a lustre in the night.

Those who have attempted to give an account of these mountains, have ascribed their brightness to shining rocks or white moss, and the highest summit has been represented as inaccessible by reason of the extreme cold which threatens to freeze the traveller in the midst of summer. They have also differed so widely from each other, and their accounts have been embellished with so many marvellous circumstances, and on the whole have been so unsatisfactory, that I have long wished for an opportunity to visit these mountains in company with some gentlemen of a philosophical turn, furnished with proper instruments and materials for a full exploration of the phenomena that might occur. This pleasure I have in part enjoyed the present summer; and though the roughness of the way which prevented the use of convenient carriages, proved fatal to some of our instruments, and the almost continual cloudiness of the weather while we were in that region hindered us from making some observations which we intended; yet till a better account can be obtained, I flatter myself that what follows will prove more satisfactory than any which has yet been published or reported.

The white mountains are the highest part of a ridge which extends north-east and south-west to an unknown length. The area of their base is an irregular figure somewhat resembling an isocles triangle, whose longest extremity is toward the south, and whose whole circuit cannot be less than fifty miles. The number of summits within this area cannot be ascertained at present, the country round them being a thick wilderness. On the north-west side seven summits are in plain view, and this is the greatest number that can be seen at once from any station that is cleared of woods. Of these, four at least are bald. The highest of them is on the eastern side of the cluster,

on which side we ascended, having first gained the height of land between the waters of Saco and Amariscogin rivers, to which there is a gradual ascent for twelve miles from the plains of Pigwacket. At this height of land there is a meadow which was formerly a beaver-pond with a dam at each end. The water issues out of a mountain on its eastern side in the form of springs, and meandering through the channels of the meadow appears stagnant in the middle but dividing its course, at the south end of the meadow it runs into Ellis river, a branch of Saco ; and at the north end into Peabody river, a branch of Amariscogin. From this meadow there is an uninterrupted ascent on a ridge between two deep gullies to the highest summit.

The sides of the mountains are covered with spruce trees ; the surface is composed of loose rocks covered with very long green moss, which reaches from rock to rock, and is in many places so thick and strong as to support a man's weight. This immense bed of moss, spread over the surface of these mountains serves, as a sponge to retain the moisture brought by the clouds and vapors which are continually rising and gathering round the mountains ; the thick growth of spruce prevents the sun's rays from penetrating to exhale it ; so that there is a constant supply of water to the numberless springs with which this region abounds, and an unceasing circulation of fluid, the process of which is highly entertaining to the spectator ; for no sooner has a shower descended from the clouds, but the vapor rises from the leaves of the forest in innumerable little columns, which, having gained a certain height in the atmosphere, collect and converge toward the mountains, where they either fall again in showers or are imbibed by the moss and deposited in the crevices of the rocks, seeking their way to the hard stratum or pan which is impenetrable, and which guides them till they find vent in springs. The same liquid tribute is daily exhaled from the rivers, ponds and low grounds, and attracted to the  
mountains,

mountains, which by these means are always replenished with water in every part.

The rocks, of which these mountains are composed, are in some parts slate, in others flint, but toward the top a dark grey stone, which, when broken, shows specks of flint-glass. On the bald parts of the mountains the stones are covered with a short grey moss, and at the very summit the moss is of a yellowish colour and adheres firmly to the rock.

Eight of our company ascended the highest mountain on the 24th of July, and were six hours and fifty one minutes in gaining the summit, deducting one hour and thirty eight minutes for the necessary stops. The spruce and firs, as you ascend, grow shorter till they degenerate to shrubs and bushes, then you meet with low vines bearing a red and a blue berry, and lastly a sort of grass called winter grass mixed with the moss.

Having ascended the steepest precipice, you come to what is called the plain, where the ascent becomes gentle and easy. This plain is composed of rocks, covered with winter grass and moss, and looks like the surface of a dry pasture or common. In some openings between the rocks you meet with water, in others dry gravel. The plain is an irregular figure, its area uncertain, but from its eastern edge to the foot of the sugar-loaf, is upwards of a mile; on the western side it extends farther. The sugar-loaf is a pyramidal heap of loose grey rocks, not less than three hundred feet in perpendicular height, but the ascent is not so difficult as the precipice below the plain. From this summit in clear weather is a noble view, extending to the ocean on the south-east; to the highlands on the west and north-west, which separate the waters of Connecticut river from those of lake Champlain and St. Laurence; on the south it extends to Winipiseogee lake, and the highlands southward of Pemigewasset river.

It

It happened unfortunately for our company, that a thick cloud covered the mountain almost the whole time that they were on it, so that some of the instruments which, with much labor they had carried up, were useless. In the barometer the mercury ranged at 22.6 inches, in 44 degrees of heat by Fahrenheit's thermometer. It was our intention to have placed one of each of these instruments at the foot of the mountain, at the same time that others were carried to the top; but they were unhappily broken in the course of our journey, and the barometer which was carried to the summit, had suffered so much agitation that an allowance was necessary to be made in calculating the height of the mountain, which our ingenious companion, the Rev. Mr. Cutler, of Ipswich, estimates in round numbers at 5500 feet above the meadow, the meadow being 3500 feet above the level of the sea, and this seems to be as low an estimation as can be admitted. We intended to have made a geometrical mensuration of the altitude, but in one place where we attempted it, we could not obtain a base of sufficient length, and in another, where this convenience was removed, we were prevented by the almost continual obstructions of the mountains by clouds.

On every side of these mountains are many long winding gullies, beginning at the precipice below the plain and deepening in the descent; they are from one hundred to one thousand feet deep, and perhaps more. In winter, the snow driving with the north-west winds over the tops of the mountains, is lodged in these gullies, and forms a compact body which is not easily dissolved by the vernal sun. It is observed to lie longer on the south, than on the north-west sides; which is the case with most other hills in this part of the country. In 1774 some men who were at work on a road under the eastern side of the mountain, ascended to the summit on the 6th of June, and upon the south side found a body of snow thirteen feet deep, and so hard as to bear

bear them. The man from whom I had this account, and who had the direction of the work, ascended the mountain on the 19th of June, with some of the same party, and in the same spot the snow was five feet deep. On the 22d of July this year, we were assured by persons who live within plain view of the mountains, on the south side, at the distance of sixteen miles, that the snow had not been gone more than ten days. We were also credibly informed that two men, who attempted to ascend the mountain the first week of September last year, found the bald top so covered with snow and ice, then newly made, that they could not gain the summit; but this does not happen every year so soon, for the mountain has been ascended so late as the first week in October, when no snow was upon it; and sometimes the first snows that come dissolve before the winter sets in; but generally the mountains begin to be covered with snow and ice, either in the latter part of September, or the beginning of October, and it never wholly leaves them till July. During this period of nine or ten months, they exhibit more or less of that bright appearance, from which they are denominated *white*. In the spring when the snow is partly dissolved, they appear of a pale blue streaked with white; and after it is wholly gone, at the distance of forty or sixty miles, they are altogether of a pale blue inclining to the colour of the sky; while viewed at the distance of only ten miles, they are of the grey colour of the rock inclining to brown. These changes are observed by people who live within constant view of them, and from these facts and observations it may justly be concluded that the whiteness of them is to be ascribed wholly to the snow and ice and not to any other white substance, for in reality there is none. There are indeed in the summer months some streaks which appear brighter than other parts, but these, when viewed through a telescope, I have plainly discerned to be the enlightened edges or sides of the long deep gullies, and the dark parts the shaded sides  
of

of them; and in the course of a day these spots may be seen to vary according to the position of the sun.

It may not be amiss to query here, if so great a quantity of snow is accumulated and remains on these mountains, may it not be supposed to add a keenness to the winds which blow over them? And how many more mountains may there be toward the north and west, whose hoary summits contain the like or greater bodies of snow and ice, some of which, at the remotest regions, may remain undissolved through the year? May we not then ascribe the piercing cold of our north-west winds to the infinite ranges of frozen mountains, rather than to the lakes and forests?

These immense heights which I have been describing, being copiously replenished with water, exhibit a variety of beautiful cascades, some of which fall in a perpendicular sheet or spout, others are winding and narrow, others spread on the level surface of some wide rock and then gush in cataracts over its edge. A romantic imagination may find full gratification amidst these rugged scenes, if its ardor be not checked by the fatigue of the approach. Three of the largest rivers in New-England receive a great part of their waters from this region. Amonoosuck and Israel rivers, two principal branches of Connecticut, fall from the western side of the mountains, Peabody river and another branch of Amarisogin from the north-eastern side, and almost the whole of Saco descends from the southern side. The declivities being very steep cause this latter river to rise very suddenly in a time of rain, and as suddenly to subside.

On the western part of these mountains is a pass which in the narrowest place measures but twenty two feet between two perpendicular rocks. Here a road is constructing with great labor and expence, which is the shortest rout to the upper Cohos on Connecticut river, and to that part of Canada which borders on the river St. Francis. At the height of this narrow pass the river Saco takes its rise.

A brook



A brook descends from the mountain, and meanders through a meadow which was formerly a beaver-pond, and is surrounded by steep, and on one side, perpendicular rocks—a strikingly picturesque scene! the rivulet glides along the western side of the defile, (the eastern being formed into a road) and tributary streams augment its waters, one of which is called the Flume, from the near resemblance it bears to the flume of a mill. The pass between the mountains widens as you descend; but for eight or ten miles they are so near as only to leave room for the river and its intervals. In the course of this descent you see at immense heights, and in spots perfectly inaccessible, several rocks, some of a whitish and some of a reddish hue, whose faces are polished by the continual trickling of water over them. These, when incrustated with ice, being open to the south and west, are capable in the night of reflecting the moon and star-beams to the wondering traveller, buried in the dark valley below; and these are sufficient, by the help of imagination, to give rise to the fiction of carbuncles.

We found no stones of any higher quality than flint\*; no limestone, though we tried the most likely with aqua fortis. It is said there is a part of the mountain where the magnetic needle refuses to traverse; this may contain rock ore, but our guide could not find the place. It is also said that a mineral, supposed to be lead ore, has been discovered on the eastern side. One of the springs which we met with in our ascent on that side afforded a thick frothy scum and a saponaceous taste. All searches for subterranean treasures in these mountains have as yet proved fruitless. The most certain riches which they yield are the freshets which bring down the soil to the intervals below, and form a fine mould, producing corn, grain and herbage in the most luxuriant plenty.

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*Description*

\* Some specimens of rock-crystal have been found lately by other persons, but we did not hear of it till after our return.